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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/002,035	11/01/2001	Jeffrey W. Carr	RAPT-01000US1	5043

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EXAMINER

OLSEN, ALLAN W

ART UNIT	PAPER NUMBER
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1763

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/26/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/002,035

Applicant(s)

CARR, JEFFREY W.

Examiner

Allan Olsen

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-15, 18-21, 32, 37, 39, 41, 42, 44-60, 62, 64 and 66 is/are pending in the application.
- 4a) Of the above claim(s) 41, 42, 46, 50, 54 and 58 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3-15, 18-21, 32, 37, 39, 44, 45, 47-49, 51-53, 55-57, 59, 60, 62, 64 and 66 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 May 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2/20/07.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 11, 2007 has been entered.

All claims are rejected for reasons of record. The rejections as set forth in the Final Office action of August 14, 2006 are repeated below.

All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued examination and the submission under 37 CFR 1.114. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 1763

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Claim Rejections - 35 USC § 103

Claims 3, 5-12, 18, 20, 21, 32, 37, 39, 44, 45, 47-49, 51-53, 55, 60, 62, 64 and 66 are rejected under 35 U.S.C. 102(b) as being anticipated by Zarowin et al. in Rapid, Non-Contact, Damage Free Shaping of Optical & Other Surfaces with Plasma Assisted Chemical Etching, 43rd Annual Symposium on Frequency Control 1989, 623-626 (hereinafter, Zarowin) in view of Böhm et al. in DE 199 25 790 (hereinafter, Böhm)

Zarowin teaches using a reactive atom plasma to provide a damage free and contamination free, shaped optical surface. Because the annulus center of Zarowin's annular plasma is continually supplied with a reactive species such as CF_4 and SF_6 , Zarowin is considered to teach "injecting a flow of a species into the annulus center of the annular plasma to create at least one reactive species". Zarowin teaches controlling the flow of plasma gases to adjust the balance between etching and deposition processes. See: figures 1, 2 and 9; also, the 2nd and 4th paragraphs on page 623 and the 1st paragraph on page 624.

Zarowin does not teach supplying a separate flow of a precursor into the annulus center of an annular plasma.

Böhm teaches supplying a separate flow of a precursor into the annulus center of an annular plasma.

Art Unit: 1763

It would have been obvious to one skilled in the art to provide a separate flow of reactive species into the core of the Zarowin's plasma because Böhm teaches that this gas inlet scheme provides a plasma with an inert sheath so reactive species do not make contact with components of the plasma system thereby eliminating a source of contamination (see paragraph bridging pages 4 and 5 of the translation).

Claims 3-12, 19-21, 32, 37, 39, 44, 45, 47-49, 51, 60, 62, 64 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bollinger et al. in "Rapid, Non-Contact Optical Figuring of Aspheric Surfaces with Plasma Assisted Chemical Etching (PACE)" in SPIE Vol. 1333 page 44-57 (hereinafter, Bollinger) in view of Zarowin and further in view of Böhm.

As the title of the paper indicates, Bollinger teaches using a reactive atom plasma to shape aspherical optical surfaces. Bollinger teaches supplying the plasma reactive species such as CF_4 and SF_6 . Bollinger teaches removing damage introduced by previous process steps. See: pages 44 - 47, 51, 52 and 57.

Bollinger does not teaches an annular plasma.

Zarowin teaches an annular plasma.

Zarowin does not teach supplying a separate flow of a precursor into the annulus center of an annular plasma.

Böhm teaches supplying a separate flow of a precursor into the annulus center of an annular plasma.

It would have been obvious to one skilled in the art to carry out Bollinger's process with an annular plasma while providing a separate flow of reactive species into

Art Unit: 1763

the core of the annular plasma because it is readily apparent that the system and process of Bollinger and Zarowin are essentially the same and Bollinger's complete silence with regard to the plasma footprint suggests that the footprints taught by figure 2 of Zarowin are applicable to the process of Bollinger. It would have been obvious to one skilled in the art to provide a separate flow of reactive species into the core of the plasma because Böhm teaches that this gas inlet scheme provides a plasma with an inert sheath so reactive species do not make contact with components of the plasma system thereby eliminating a source of contamination (see paragraph bridging pages 4 and 5 of the translation).

Claims 13-15, 56, 57 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bollinger in view of US Patent 5,961,772 issued to Selwyn, in view of Böhm and further in view of US Patent 6,068,784 issued to Collins et al. (hereinafter, Collins).

The above noted teachings of Bollinger are herein relied upon.

Bollinger does not teach using Ar. Bollinger does not teach operating near atmospheric pressure.

Selwyn teaches that the provision of a high flow rate of argon enables one to carry out a process similar to that of Bollinger's at atmospheric pressure rather than at the low pressure taught by Bollinger. For example, Selwyn teaches etching SiO₂ with a room temperature, atmospheric pressure plasma wherein the plasma gases comprise CF₄ and Ar.

Art Unit: 1763

Selwyn does not teach providing a separate flow of the reactive precursor into the annulus center of an annular plasma.

Böhm teaches supplying a separate flow of a precursor into the annulus center of an annular plasma.

It would have been obvious to one skilled in the art to carry out Bollinger's process by adding the CF_4 or SF_6 to the annulus center of an annular inert gas plasma because Selwyn teaches that the by adding Ar to CF_4 or SF_6 plasma of Bollinger enables one to operate the system at atmospheric pressure which greatly simplifies the operational demands of the process and Selwyn demonstrates that etch rates for process carried out at atmospheric pressure are greater than those carried out under a typical low pressure condition. Furthermore, it would have been obvious to one skilled in the art to provide a separate flow of Bollinger's reactive species, CF_4 or SF_6 , into the core of an annular inert plasma because Böhm teaches that this gas inlet scheme provides a plasma with an inert sheath thereby preventing reactive species from making contact with components of the plasma system and eliminating a source of contamination (see paragraph bridging pages 4 and 5 of the translation).

Bollinger and Selwyn do not teach using C_2F_6 to etch SiO_2 .

Collins teaches using C_2F_6 to etch SiO_2 .

It would have been obvious to one skilled in the art to use C_2F_6 in place of CF_4 to etch SiO_2 because Collins teaches that CF_4 and C_2F_6 are functionally equivalent as a fluorocarbon etchant of SiO_2 .

Response to Arguments

As set forth in the Advisory action of December 15, 2006:

Applicant's arguments filed November 14, 2006 have been fully considered but they are not persuasive.

Applicant argues that by their method, reactive species are generated by exciting a precursor "with a radio frequency (RF) power via the annular plasma" whereas in the applied art, reactive species are generated by directly exciting a precursor with an applied electromagnetic radiation. Applicant's reliance on an intermediary annular plasma as a means of transferring energy to the precursor may very well facilitate a shift from a direct excitation to an indirect excitation. Nevertheless, the applied references teach injecting a precursor into an annular plasma whereby at least some indirect excitation of the precursor will occur.

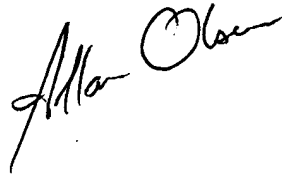
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is 571-272-1441. The examiner can normally be reached on M, W and F: 1-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1763

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "Allan Olsen", is written diagonally across the page.

Allan Olsen
Primary Examiner
Art Unit 1763